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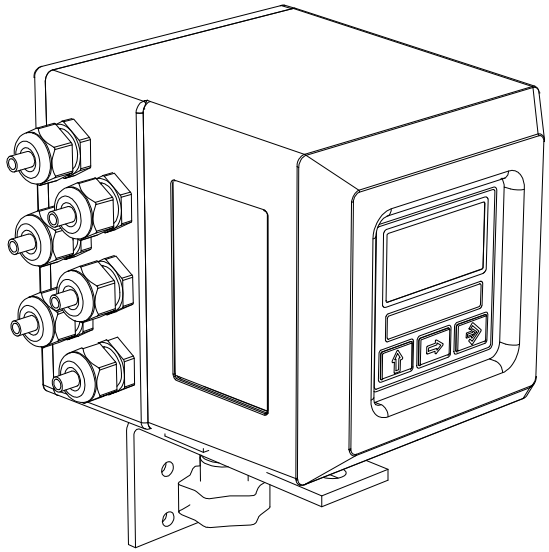
bürkert
Fluid Control Systems

OPERATING AND INSTALLATION MANUAL

CONVERTER

SE 56



CE

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Fluid Control Systems

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INTRODUCTION

This manual is integral part of the product. Read carefully the instructions contained since they give important indications for the safe use and maintenance.
Technical information and relative products in this manual could undergo modifications without any previous notice.
The flow meter must be used for what it has been built for. The improper use, possible tampering of the instrument or parts of it and substitutions of any not original components, make the warranty to decay automatically.
The manufacturer is considered responsible only if the instrument it's used in his original configuration.
Reproduction of the present manual and of any possible software supplied with the instrument is strictly forbidden.

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Symbols Used in the manual

ATTENTION

DANGER ELECTRIC SHOCK

WARNING

PRECAUTIONS

TECHNICAL CHARACTERISTICS

ELECTRIC CHARACTERISTICS

Classification of the instrument: class I, IP 67, category of installation II

Power supply versions	Power supply voltage	Power supply frequency	Pmax	current max
HV	90÷265 Vac	44÷66 Hz	20W/25VA	0,25 A
LV	18÷45 Vac/dc	0-44÷66 Hz	20W/25VA	1,6 A
LLV	10÷35 Vdc		20 W	1,5 A

INPUT/OUTPUT ISOLATION

Input/output are insulated up to 500V

- The output 4÷20 mA and the output 24 Vdc are electrically connected

ENVIRONMENTAL CONDITIONS OF USE

The instrument can be installed inside or outside buildings
Altitude: from –200 a 6000 m (from -656 to 19685 feet)
Humidity range: 0÷100% (IP 67)

- Line voltage range: (see table on technical characteristics)

OPERATING TEMPERATURE

CONVERTER			
Ambient Temp.			
Min.		**Max**	
°C	**°F**	**°C**	**°F**
-20*	-4*	60	140

*** For discontinuous use, the installation of a heating resistance is necessary**

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OVERALL DIEMENSIONS

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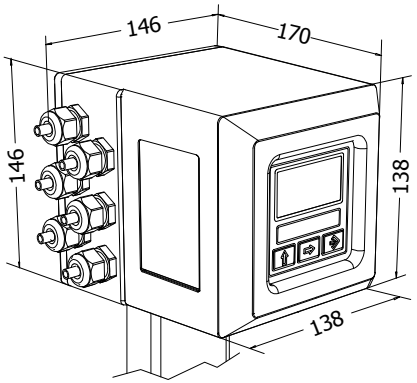
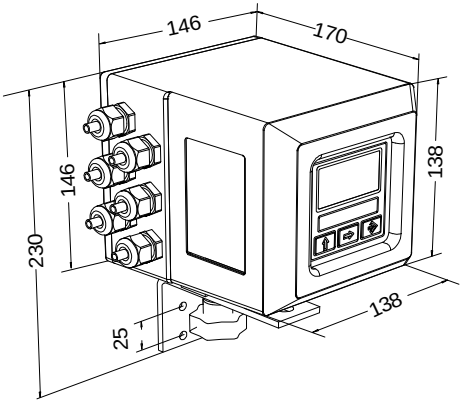
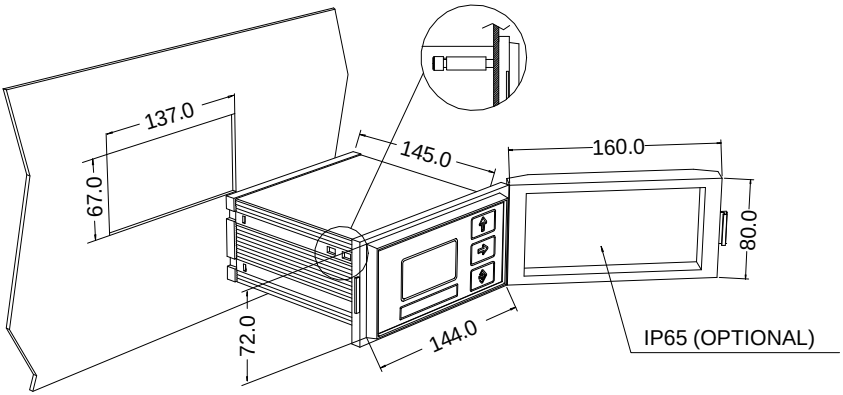
COMPACT VERSION



SEPARATE VERSION



PANEL VERSION



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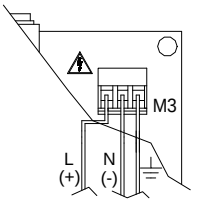
GROUNDING INSTRUCTIONS

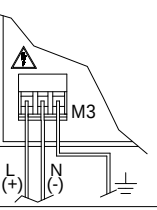
For the correct operation of the meter it's NECESSARY that sensor and liquid are equipotential, so ALWAYS connect **sensor** and **converter** to the ground

CONVERTER POWER SUPPLY

Wall version



Panel version

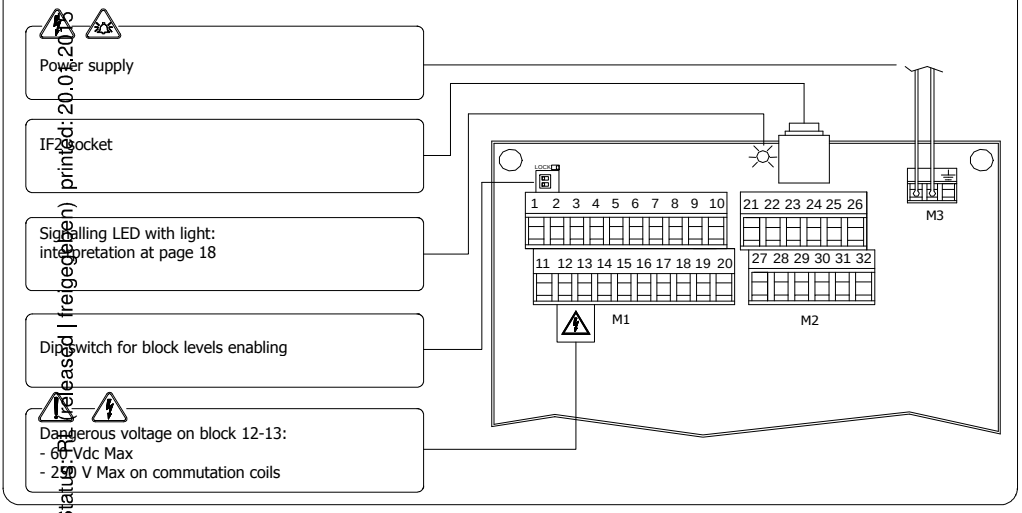


- Before connecting the power supply, verify that the mains voltage falls between the limits indicated on the tag plate
- **ATTENTION:** the converters on dc power supply line are not protected against the inversions of polarity.
- For the wiring use only approved conductors, with fireproof properties.
- The power supply line must be equipped with an external protection for current overload (fuse or automatic line breaker with limiting capacity not greater than 10 A).
- In the proximity of the instrument Provide a circuit breaker that must be easily accessible from the operator and clearly identified.

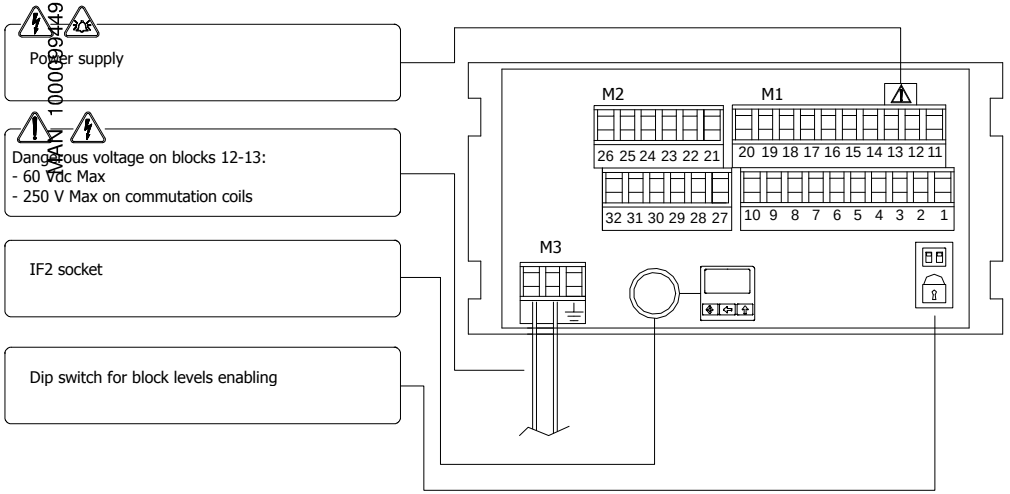
NOTE: characteristics of meter's power supply, see page 4

ELECTRICAL CONNECTIONS

TERMINAL BLOCK M1 FOR COMPACT/SEPARATE VERSIONS


Power supply
IF2 socket
Signalling LED with light:
interpretation at page 18
Dip switch for block levels enabling
Dangerous voltage on block 12-13:
- 60 Vdc Max
- 250 V Max on commutation coils
1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26
27 28 29 30 31 32
M1
M2
M3

TERMINAL BLOCK M1 FOR PANEL VERSIONS


Power supply
Dangerous voltage on blocks 12-13:
- 60 Vdc Max
- 250 V Max on commutation coils
IF2 socket
Dip switch for block levels enabling
M2
M1
26 25 24 23 22 21
20 19 18 17 16 15 14 13 12 11
32 31 30 29 28 27
10 9 8 7 6 5 4 3 2 1
M3

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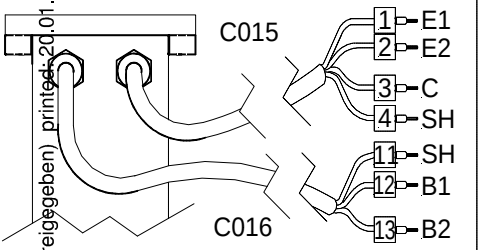
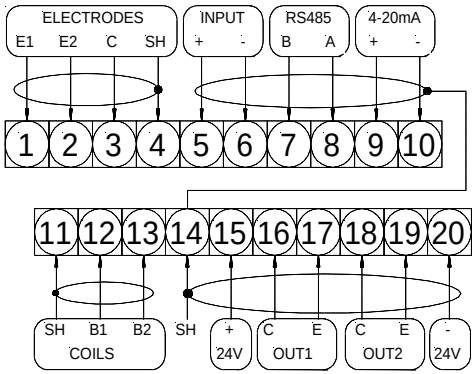
ELECTRICAL CONNECTIONS SENSOR TO CONVERTER

SEPARATE VERSION



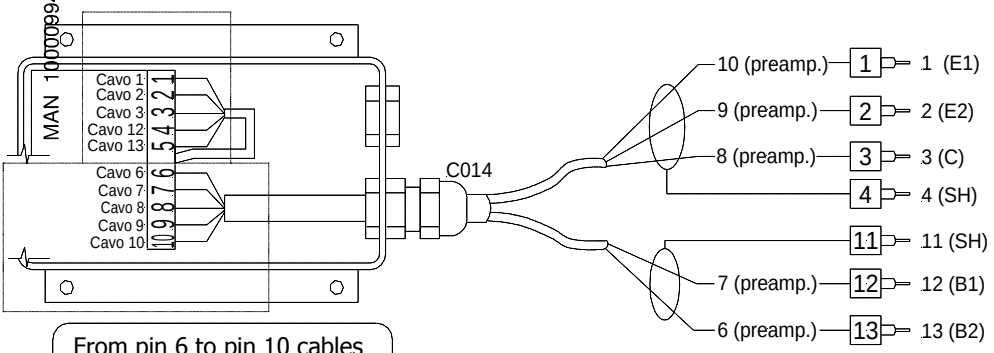
Sudden movements of the electrodes cable, can cause noises on measure
Max length of cable: m 20

TERMINAL BLOCK M1



PREAMPLIFER VERSION

From pin 1 to pin 5 cables connected to the sensor



From pin 6 to pin 10 cables connected to the converter

Max length of the cable C014 : 500 m

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INPUT/OUTPUT

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OPTIONAL MODULE (NO RELE MODULE)

- ❑ **ME200:** 2 programmable on/off outputs
- ❑ **ME201:** 1 programmable on/off output + 1 high frequency output
- ❑ **ME202:** 1 0/4…20mA output + 2 programmable on/off output
- ❑ **ME203:** 1 RS232 port + 2 programmable on/off outputs
- ❑ **ME204:** 1 RS232 port + 2 programmable on/off outputs + 1 0/4…20mA out
- ❑ **ME220:** see the manual

LEGENDA

SC: Cable shield, electrically connected to ground and to the casing

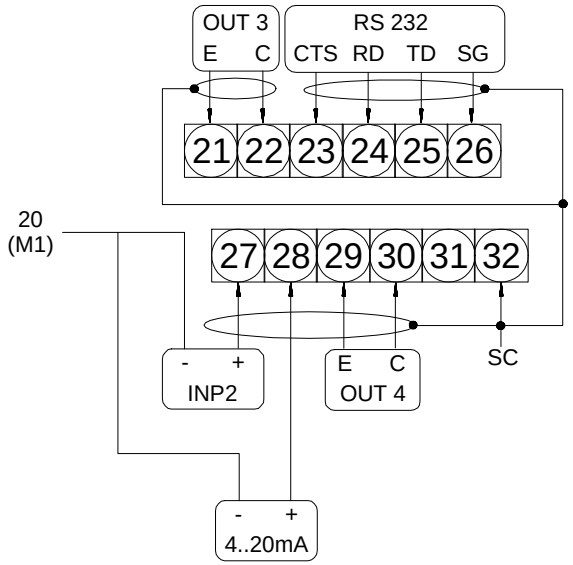
CTS: Input terminal of the signal "CLEAR TO SEND" of the RS232 port

RD: Input terminal of the signal "RECEIVE DATA" RS232 port

TD: Output terminal of the signal "TRASMIT DATA" of the RS 232 port

SG: Terminal "SIGNAL GROUND" common to all signals of the RS232 port

C: Terminal connected with the COLLECTOR of the transistor of the on/off output



INPUT/OUTPUT

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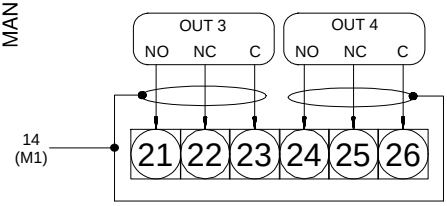
OPTIONAL RELE' MODULE

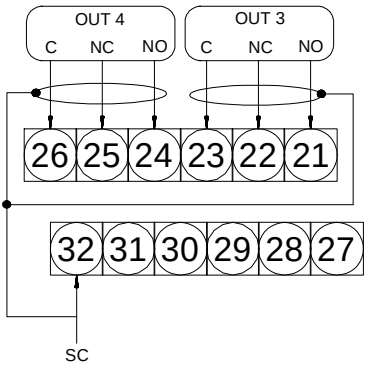
ME205: 2 relay outputs with 1 NO contact + 1 NC contact each, 2A 60Vac, 60W/125Va

ME207: 2 relay outputs with 1 NO contact + 1 NC contact each, 2A 250Vac, 60W/125Va

LEGENDA

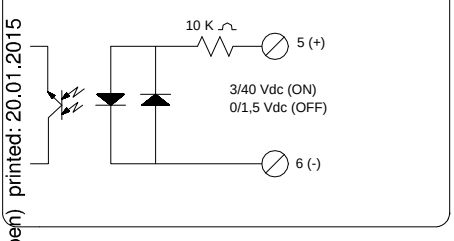
- **SC:** Cable shield, electrically connected to ground and to the casing
- **C:** relay – common
- **NC:** Normally closed contact
- **NO:** Normally open contact



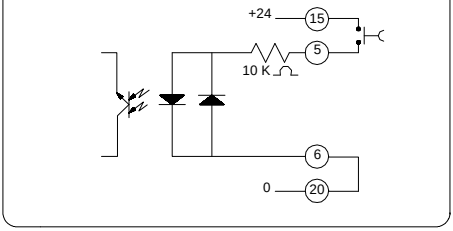


DIGITAL INPUT

External power supply



Internal power supply



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The functions referring to the inputs could be divided in three groups:

1) only assignable functions to the input 1 (page 12)

2) Functions that act directly on the inputs independently from the select input (page 13)

3) only assignable functions to the input 1 and only to the input 2 which they interact between them (some examples to page 14)

Remember that the activation of any functions of batch automatically disable the other.
The list of such functions is suitable in the tab at page 36.

OPERATION ON INPUT ON/OFF

INPUT OPERATION STAGE (GENERIC FUNCTIONS)

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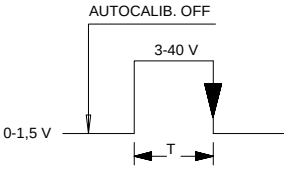
Auto-calibration



Tmin<T<1sec. = autocalibration
T > 1 sec. = Auto zero

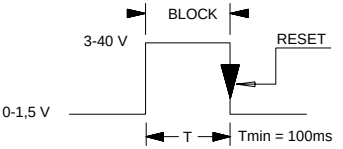
Necessary conditions for enabling the function

POS. 5.7 ENABLED

POS. 5.9 (batch on input 1) DISABLED

POS. 5.10 batch functions assign to input 2 (optional) DISABLED

Reset totalizes

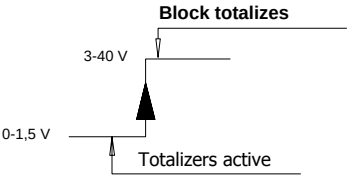


Necessary conditions for enabling the function

POS. 5.1 ÷ 5.4 ENABLED at least one

N.B.: This function is even assignable to the input 2

Block totalizes



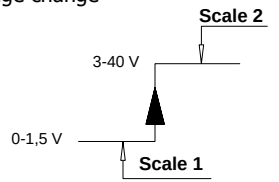
Necessary conditions for enabling the function

POS. 5.6 ENABLED

POS. 12.5 (auto-batch) DISABLED

POS. 12.7 (batch consent) DISABLED

Range change



Necessary conditions for enabling the function

POS. 5.8 ENABLE

POS. 5.9 (batch on input 1) DISABLED

POS. 5.10 batch functions assign to input 2 (optional) DISABLED

POS. 6.1-6.4 end-batch functions assign to output 2 1 e/o 2 DISABLED

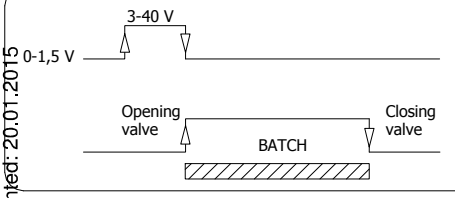
Speed rate	Tmin
10 Hz	220 ms
20 Hz	110 ms
50 Hz	45 ms
80 Hz	30 ms
150 Hz	15 ms

ATTENTION: time T must be ≥ to Tmin

N.B.: THE FUNCTIONS ABOVE INDICATED ARE ENABLED ONLY ON INPUT 1

OPERATION STAGE ON INPUT 1 OR 2 (BATCH FUNCTION)

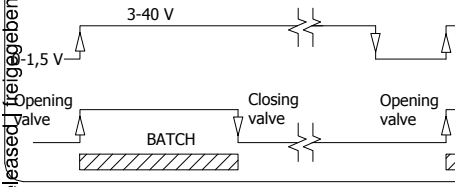
Start batch from remote input



Necessary conditions for enabling the function

- ❑ POS. 5.9 ENABLE or POS. 5.10 on batch
- ❑ POS. 6.1 ÷ 6.4 on end batch

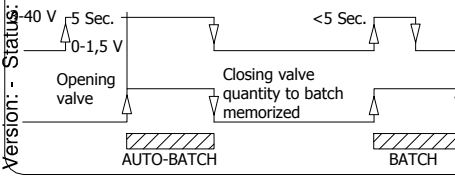
Start batch from consent (remote)



Necessary conditions for enabling the function

POS. 5.9 ENABLED or POS. 5.10 on batch
POS. 6.1 ÷ 6.4 on batch
POS. 12.7 (CONSENT MODE) ENABLED

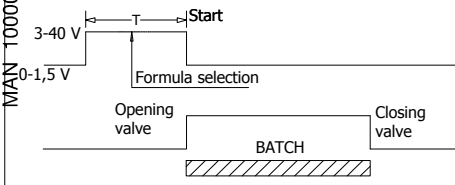
Start batch from remote input with auto-batch enabled



Necessary conditions for enabling the function

- ❑ POS. 5.9 ENABLED or
- ❑ POS. 5.10 on batch
- ❑ POS. 6.1 ÷ 6.4 on end batch
- ❑ POS. 12.5 (auto-batch) ENABLED
- ❑ POS. 12.7 (consent mode)
- ❑ DISABLED

Start batch from remote input with automatic selection of formula 00/03

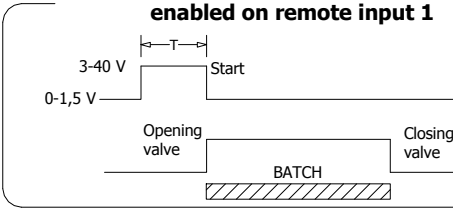


T= 100ms ±50ms for select the formula 00
T= 200ms ±50ms for select the formula 01
T= 300ms ±50ms for select the formula 02
T= 400ms ±50ms for select the formula 03
In case of stop batch from remote input the time of input

Necessary conditions for enable the function

POS. 5.9 ENABLE or POS. 5.10 on batch
POS. 6.1 ÷ 6.4 on end batch
POS. 12.6 (automatic selection of formula) ENABLED
POS. 12.7 (consent mode) DISABLED
POS. 5.10 selection function for the formula 00/01 assigned to input 2 (optional) DISABLED

Start batch from remote input 1 reset p+ enabled on remote input 1



T BEETWEEN 1 E 4 = RESET TOTALIZER
T<1 = START E RESET TOTALIZER

Necessary conditions for enabling the function

POS. 5.9 (batch on input 1) ENABLED
POS. 6.1 ÷ 6.4 on AND BATCH
POS. 5.2 (reset P+) ENABLED

N.B.: THE ACTIVATION OF BATCH FUNCTIONS ON INPUT 2 PREVENTS THE ACTIVATION OF BATCH FUNCTIONS ON INPUT 1

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OPERATION STAGE ON INPUT 1 AND 2 (BATCH FUNCTION)

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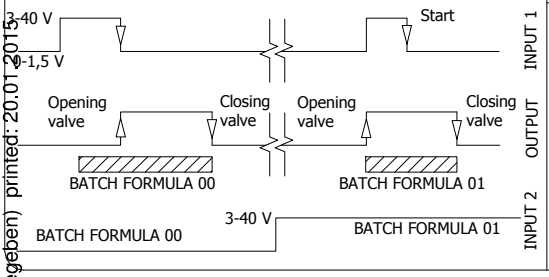
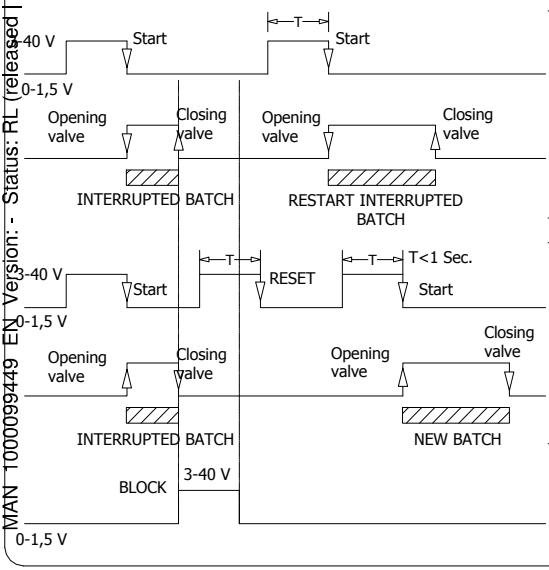
Start batch on remote input 1 stop from output selection formula 00 o 01 from remote input 2



Necessary conditions for enabling the function

POS. 5.9 ENABLED
POS. 6.1 or 6.4 on AND BATCH
POS. 5.10 function of formula selection 00/01 assigned to input 2 (optional) ENABLED

Block totalizer from remote input 1 start batch from remote input 2



The block of the totalizer always determines the interruption of the batch. Exciting again the input 2 is possible to get 2 results:

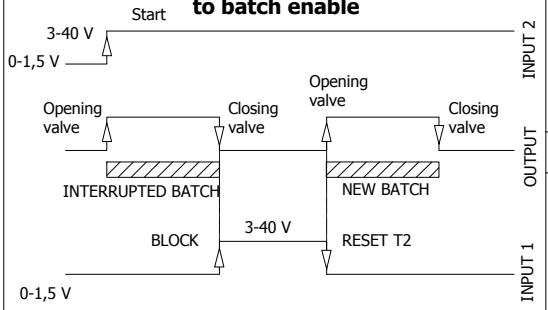
1) T< 1Sec = restart interrupted batch

2) T between 1 e 4 Sec = reset interrupted batch. N.B.: will be necessary to give a new start impulse to the input 2 (T< 1Sec) to begin a new batch

Necessary conditions for enabling the function

- ❑ POS. 5.6 (Block totalize) ENABLE
- ❑ POS. 6.1 OR 6.4 on END BATCH
- ❑ POS. 5.10 funzione di dosaggio attribuita ad ingresso 2 (optional) ENABLE
- ❑ POS. 5.2 (P+) ENABLE

Block and reset totalize from remote input 1 start batch from remote input 2 consent mode to batch enable



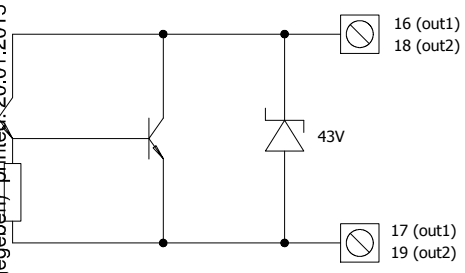
The block of the totalizer always determines the stop of batching. With the T2 reset function enabled on the input 1 descent front, the batch totalizer in use goes to zero. Therefore both the presence of the consent or a new pulse on the input 2 will determine The start of a new batch

Necessary conditions for enabling the function

- ❑ ❑ POS. 5.6 (Block totalizer) ABILITATO
- ❑ ❑ POS. 5.10 function of batch assigned to input 2 (optional) ENABLE
- ❑ ❑ POS. 12.7 (consent mode) ENABLE
- ❑ ❑ POS. 5.2 (P+) ENABLE

OUTPUTS WIRING

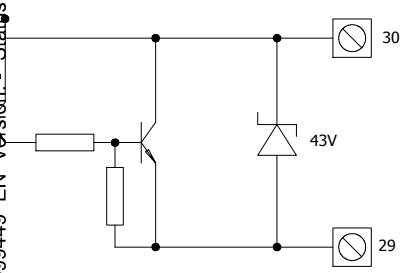
Output on/off 1250 Hz



Opto-insulated output with collector and emitter terminals floating and freely connectable
Maximum switching voltage: 40 Vdc
Maximum switching current: 100mA
Maximum saturation voltage between collector and emitter @100mA: 1,2V
Maximum switching frequency (load on the collector or emitter, RL=470Ω, VOUT=24Vdc): 1250Hz
Maximum reverse current bearable on the

OUT 1/OUT 2 standard - OUT 3/OUT 4 with modules (page 9)

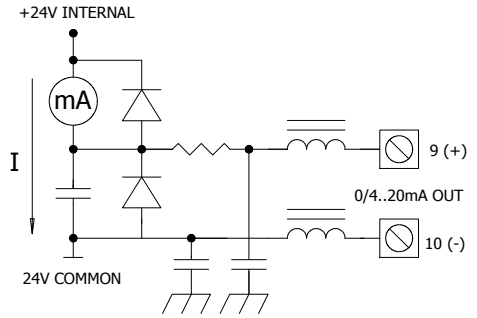
Output on/off 12500 Hz



- Opto-insualted output with collector and emitter terminals floating and freely connectable. In order to get the maximum speed performances it is necessary to connect the emitter to the common terminal of the outputs (0V), while the load has to be on the collector. This output is internally connected to the power supply source 24 Vdc available on the terminal block.
- Maximum switching voltage: 40Vdc
- Maximum switching current: 100mA
- Maximum saturation voltage between collector and emitter 100mA, load on the collector and internal power supply: 0,3V
- Maximum saturation voltage between collector and emitter 100mA, load on the emitter and internal power supply: 3V
- Maximum switching frequency, load on the collector and internal power supply: (RL=470Ω, VOUT=24Vdc): 12500Hz
- Maximum switching frequency, load on the emitter or external power supply: (RL=470Ω, VOUT=24Vdc): 2500Hz
- Insulation from the other secondary circuits (except 24V and 4...20mA outputs): 500 Vdc

Only with ME 201 module

Output 0-4÷20mA



- Opto-insulated output
- Maximum load 1000 ohm
- Maximum voltage without load 27 Vdc
- Refresh frequency equal to the sample frequency of the connected sensor
- protected against persistent over voltages till 30 Vdc

The converter detect a loss of load on the 4÷20mA output; to disable this function set the value "mA Val. Fault" to 0 (pag 28 Pos. 4.7)

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START UP AND MAINTENANCE OF THE INSTRUMENTS

Before starting up the instrument please verify the following:

- Power supply voltage must correspond to that specified in the name plate
- Electric connections must be done as described at page 8
- Ground connections must be done

Verify periodically:

- ❑ The integrity of the power supply cables, wiring and other electrical parts connected
- ❑ The integrity of the instrument's housing (this must not have bruises or other damages that may compromises the hermetical sealing)
- ❑ The tightening of the sealing elements (cable glands, covers, etc.)
- ❑ The integrity of the front panel (display and keyboard), damages may compromise the sealing
- ❑ The mechanical fixing of the instrument on the pipe or on the wall stand

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VISUALIZATION PAGES

The direct exposure of the converter to the solar rays, could damage the liquid crystals display. N.B. Contrast set see page 32 pos. 8.3

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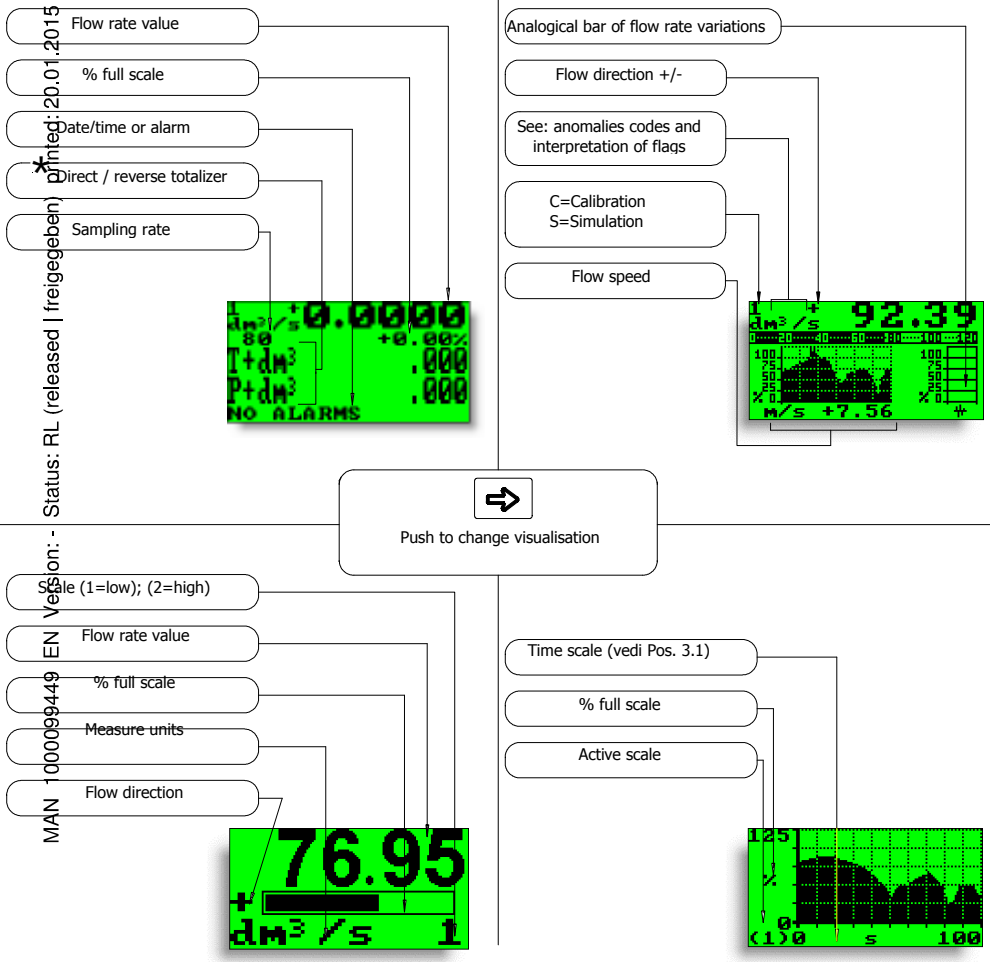
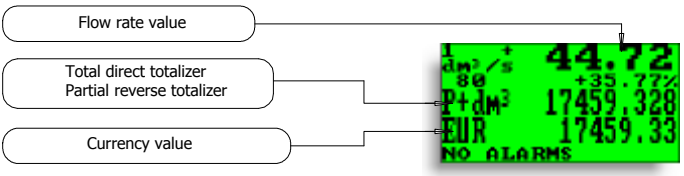


* The maximum digit shown from the totalizer is 999999999 independently from the number of selected decimal. Beyond this value the totalise are reset.

CONVERTER VISUALIZATION PAGE WITH CURRENCY FUNCTION ENABLE



NOTE

The visualization of the pages can be change respect to some functions enabled o disabled (Pos. 8.4 - 8.8 – 8.10 and batch functions)

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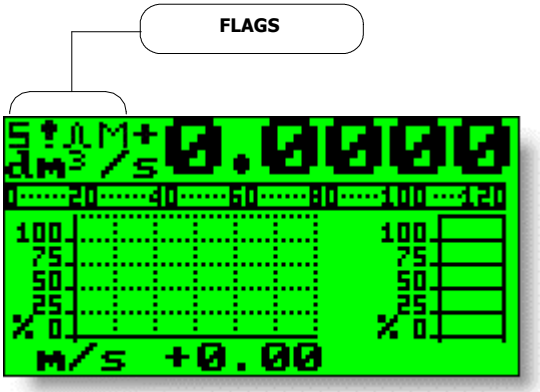
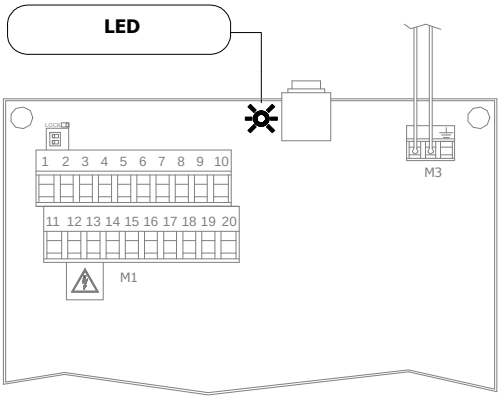
Flags interpretation and LED



INTERPRETATION FLAGS	
FLAG	**DESCRIPTION**
M	Alarm max activated
m	Alarm min activated
!	- Interruption coils circuit - Segnal error - Empty pipe
C	Calibration running
S	Simulation
⎍	Pulse output saturation (reduce TIME PULSE)



LED INTERPRETATION
PERMANENT LIGHT: initialisation
FLASHING LIGHT (1 sec.): normal function
FLASHING LIGHT (<1 SEC.): alarm on
The LED signals the real alarm status only if the display visualizes one of the visualization pages suitable to page 17
ATTENTION: in the panel version the LED is not visible

KEYBOARD

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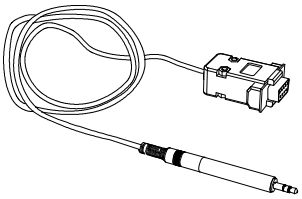
SHORT PRESSING (< 1 SECOND):
It increases the numeric figure or the parameter selected by the cursor
It goes to the previous subject on the menu
batch start/stop (when enabled)
LONG PRESSING (> 1 SECOND):
It decreases the numeric figure or the parameter selected by the cursor
It goes to the next subject on the menu

SHORT PRESSING (< 1 SECOND):
It moves the cursor rightward on the input field
It goes to the following subject of the menu
It changes the display of the process data
LONG PRESSING (> 1 SECOND):
It moves the cursor leftward on the input field
It goes to the previous subject on the menu

SHORT PRESSING (< 1 SECOND):
It enters /leaves the selected function
It enables the main menu for the instrument configuration
It cancels the selected function under progress
LONG PRESSING (> 1 SECOND):
It leaves the current menu
It enables the totalise reset request (when enabled)
It confirms the selected function

BLIND VERSION



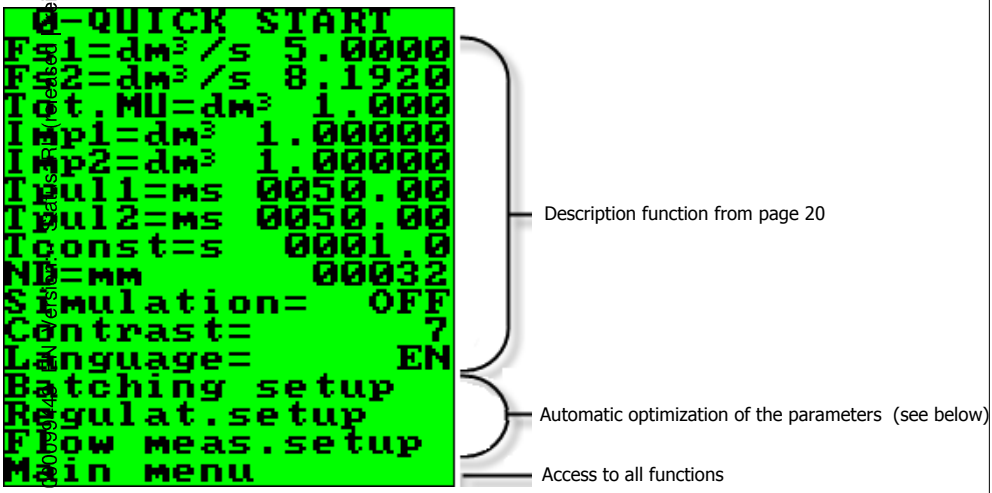
For converter without keyboard (blind version), the programming of functions is made up by the IF2 serial device:

MENU DEL CONVERTITORE ML210

Some of more use functions are available in immediate way in the "Quick start menu" pressing the key . This menu can be disabling by the function 8.6 in the display menu; in this case, pressing the key the access will be directly to the main menu.

MAN 1000044 EN Version: A Status: RL (released) printed: 20.07.2005

QUICK START MENU FUNCTIONS



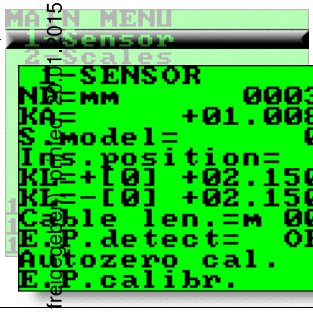
The functions "batching setup, regulation setup, flow measure setup" they instantaneously shape the instrument for the set up operation modifying in optimal way all the parameters refer to the chosen operation. For enable one of three types of operation press on the function the key and then the key to confirm.

ML210 Functions

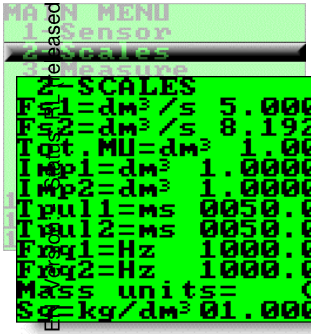
(for detail functions with symbol "*"see the manual from page 27)

Attention: The function in grey colour are visualized on display only with other active functions or with optional modules

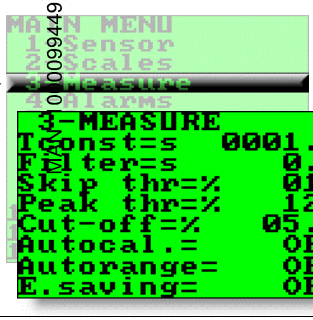
Modifiche riservate | Subject to change without notice | Sous réserve de modifications | Änderungen vorbehalten | Reservado el derecho de modificaciones | Reservado o direito de modificações | Wijzigingen voorbehouden | Ret til ændringer forbeholdes | Ändringar förbehålles | Zastrzega się prawo do zmian | Změny vyhrazeny | Változtatások jogát fenntartjuk | Με επιφύλαξη τροποποιήσεων | Değişiklik hakkı saklıdır | Rev. 1.0 del 30/11/2015 | MAN 0100099449 EN Ver. 1.0 del 30/11/2015



1.1 Insert ND of sensor (0-3000)
1.2 Calibration data of sensor visualized on sensor's label
1.3 Sensors model: Enter the first two characters of the serial number of the sensor
1.4 Position for insertion sensors: 0=1/8DN, 1=1/2DN, 2=7/8DN
1.5 Factory parameter
1.6 length of the cable connecting the sensor to the converter
1.7 Enables the empty pipe detection feature
1.8* Enables the automatic zero calibration system
1.9* Enables the automatic calibration procedure of the empty pipe detection



2.1* Full scale value set for range N.1
2.2* Full scale value set for range N.2
2.3* Unit of measure and number of decimal totalizes
2.4* Pulse value on channel 1
2.5* Pulse value on channel 2
2.6* Duration of the pulse generated on channel 1
2.7* Duration of the pulse generated on channel 2
2.8 Full scale freq. for channel 1 (0.1Hz-1000.0Hz) (0.1Hz-10000Hz con modulo opt.)
2.9 Full scale freq. for channel 2 (0.1Hz-1000.0Hz) (0.1Hz-10000Hz con modulo opt.)
2.10 Enable/disable the selection of mass units on full scale set
2.11 Specific gravity set in kg/dm³



3.1* Time constant
3.2 Filter on the power supply: 0.1s="ready" measure; 0.5s=filter of noise on the liquid
3.3* Acceleration threshold
3.4* Anomalous signal pick cut off threshold
3.5 Low flow zero threshold: 0-25% of full scale value
3.6 Enable every hour a internal cycle of calibration. The measure it's stopped for 8-15 sec.
3.7* Automatic change of scale
3.8* Energy saving

4.1 Maximum value alarm set for direct flow rate
4.2 Maximum value alarm set for reverse flow rate
4.3 Minimum value alarm set for direct flow rate
4.4 Minimum value alarm set for reverse flow rate
4.5 Hysteresis threshold set for the minimum and maximum flow rate alarms
4.6 Empty pipe detection threshold. It's automatically set by the function 1.9
4.7* Current output value in case of failure
4.8* Frequency output value in case of failure
4.9* Batch safety timer

Software version: - | freigegeben am: 20.01.2015

```
 5-INPUTS
T+ RESET=        ON
P+ RESET=        ON
T- RESET=       OFF
P- RESET=        ON
Puls.reset=     OFF
Count lock=      ON
Calibration=    OFF
Range change=   OFF
Batch=          OFF
Inp.2=          OFF
```

5.1* Total direct (positive) flow totalise reset enable
5.2* Partial direct (positive) flow totalise reset enable
5.3* Total reverse (negative) flow totalise reset enable
5.4* Partial reverse (negative) flow totalise reset enable
5.5 Reset totalise of pulse from digital input (see page 12)
5.6 Totalise counting lock command (see page 12)
5.7* Autozero calibration external command
5.8 Range change external command (see function 3.7)
5.9 Batch start/stop external command (see batch functions)
5.10* Functions assigned to input 2

```
 6-OUTPUTS
Out1=      #1  IMP+
Out2=          SIGN
Out3=           OFF
Out4=      #2  IMP+
Duty cycle1=% 50
Out mA1=4÷22
Out mA2=4÷22
```

6.1* Output 1 functions
6.2* Output 2 functions
6.3* Output 3 functions
6.4* Output 4 functions
6.5* Duty cycle value for pulses/frequency output
6.6* Choice of the function and the range of current output n.1
6.7* Choice of the function and the range of current output n.2

```
 7-COMMUNICATION
IF2 prot.=      DPP
RS232 prot.=    DPP
Address=        000
RS485 bps=    19200
RS232 bps=     4800
Printer=        OFF
Print batch=    OFF
Print data=     OFF
Print events=   OFF
Rem.addr.=      000
Remote u.conn.
```

7.1 Choice of the communication protocol for the IF2 device
7.2 Choice of the communication protocol for the RS232 port
7.3 Address value of converter (range 0 – 255)
7.4 Speed of the RS485 output (possible choices: 2400, 9600, 19200, 38400 bps)
7.5 Speed of the RS232 output (possible choices: 2400, 9600, 19200, 38400 bps)
7.6 Print function enables (optional; see manual MI200)
7.7 Print of the performed batch
7.8 Stampa dei dati ad intervalli regolari ed impostabili
7.9 Print of the data process on regular intervals
7.10 Address of a further converter connected like a terminal
7.11 Start remote connection to the terminal. Connection interrupted after 10sec. of inactivity

```
 8-DISPLAY
Language=        EN
D.rate=Hz         1
Contrast=         7
P.totaliz.=      ON
Date/time=      OFF
Quick start=    OFF
Tot.modif.=     OFF
Net total.=     OFF
Reset video=    OFF
Currency=        ON
Curr.decim.=      2
EUR/dm³ + 1.00000
EUR/dm³ - 1.00000
```

8.1 Choice of the language: E= English, I=italian, F= French, S= Spanish
8.2 Updating frequency on the display: 1-2-5-10 Hz
8.3* Display contrast
8.4 Partial totalizer visualization (with batch enable the function is always on)
8.5 Date and time visualization with data logger enable
8.6 Quick start menu visualization
8.7 Enable the change value of the totalizers (see function 5.1-5.4)
8.8* Enable the page of net totalizer (difference between direct and reverse. see page 17)
8.9 Reset the processor of the display (useful in case of particular badly operations of the display)
8.10 Visualizes the values of the partial totalirer in the unit of selected currency
8.11 Choice of the numbers of decimals for the visualization currency value: From 0 to 3
8.12* Value of conversion/currency for direct totalizer
8.13* Value of conversion/currency for reverse totalizer

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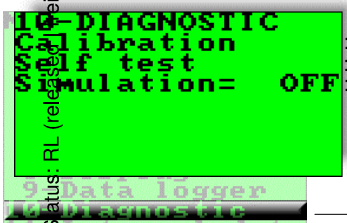
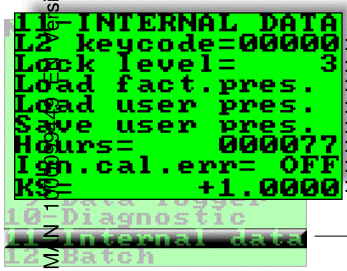
9.1* Date and time set
9.2 Automatic data logger enable
9.3 Interval time for the data logging function: 1, 2, 3, 6, 8, 12, 24, 48 hours
9.4 Displaying of the data stored in the data logger
9.5 Displaying of the last 64 alarms stored in the data logger
9.6 Visualization function of minimum and maximum peak of flow rate
9.7 Logged data cancel function
9.8 Reset all alarm events
9.9 Reset all minimum and maximum peak of flow rate stored

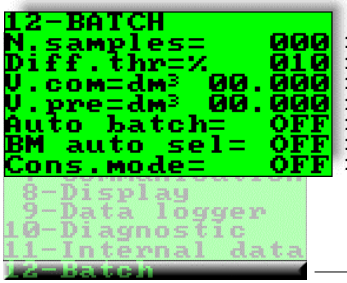


10.1* Enable the calibration of the converter
10.2* Converter autotest
10.3* Flow rate simulation enabling



11.1 Level 2 access code enter
11.2 Block level function can be set from 0 to 3
11.3 Load factory data pre-set
11.4 Load user data saved
11.5 Save user data
11.6 Visualisation of the total operation hours of the converter (function not editable)
11.7 Ignore the calibration error during the switch on test
11.8 Ks Coefficient

Menu 12: Menu visualized only with batch active
(see from pag. 35)



12.1 of batch cycles to be done to define the value of compensation. Value 0=OFF
12.2* % limit of compensation threshold
12.3* Compensation value
12.4* Prebatch value
12.5* Auto-batch
12.6* Automatic selection of batch formula
12.7* Static consent of batch

ACCESS TO THE CONFIGURATION MENUES

The access to the configuration menu can take place in two different modes:

- Through the **"Quick start menu"** where it is possible to access directly to some of the principal functions
- Through the **"Main menu"** where it is possible to access to all function with access code ≤ 2

We show below some examples relating to the change of the value in the "Fs1" function

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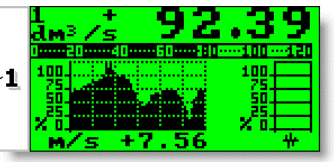
EXAMPLE: modifying the full scale value from 4dm³/s to 5dm³/s. from "Quick start menu"

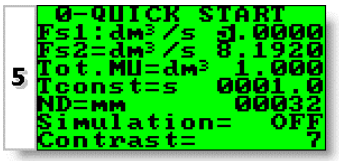


Enter in the "Quick start menu"

Access to the function "Fs1"

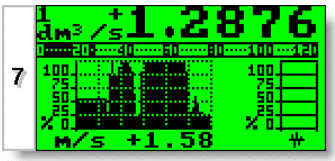
Push repeatedly

Change the value



Confirm the new value

Long push



Main page

EXAMPLE: modifying the full scale value from 4dm³/s to 5dm³/s.
from "Main Menu" (quick start menu enable)

Printed: 20.07.2015 (from 00000069449 EN Version: RL (release) Status: RL (released))

ACCESS CODES

Some functions in the converter are enabled by the access codes. The information's of this manual are related to all the functions available with L2 level. All the functions available through higher level are protected and reserved to the service.

Description of the L2 access code
(Menu "11 Internal data" pos. 11.1)

- **with code L2 = 00000** you disable the request of code
  NOTE: the availability of the functions is related to the selected block
- ***with L2 customised** (freely chosen by the user) you can proceed programming all the functions up to L2 security level, entering the code itself whenever you need enter the Main menu

***ATTENTION:** take note very carefully of the customised code you have chosen, since there is no way for the user to retrieve it if it forgotten

FACTORY PRE-SETTINGS ACCESS CODES

The converter is delivered with access code L2:

11111

and with the "Quick start menu" enable. Press the key ◈ to access to the "Quick start menu" from one of the visualization pages

The "Quick start menu" it's enable by 8.6 function (display menu); from the "Quick start menu" the functions may be set without entering any access code (see example 1 on page 24).
The last function allows to access the main menu.

BLOCK LEVELS

the block level enables or disables the access to the functions of the converter.
The available levels of block are the following:
(Menu "11 Internal data" pos. 11.2)

- **Level 0**: it completely disables the access to the functions. You can perform the following functions through the keyboard:
  - Changing the display mode
  - Dosing Start/stop
  - Data printing
- **Level 1**: it enables the access to the following functions:
  - Totalise re-setting
  - Dosing functions modifications
- **Level 2**: it enables the access to the following functions:
  - Quick start menu
  - Scale (full enabling)
  - Display (partial enabling)
  - Diagnostics (partial enabling)
- **Level 3**: it enables the access to all the functions of level 2

FACTORY PRE-SETTINGS BLOCK LEVELS

The converter is delivered with the following block level:

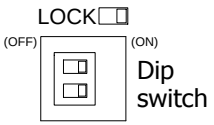
3

If for several reasons you need to change the block level, follow the steps:

- Set the dip switch on OFF position
- Access to the function "Block level" of menu 11 (main menu)
- Choose the desired level of block

To enable the selected block level place the DIP switch on the ON position

When the Dip-switches are on "OFF", all functions are available.

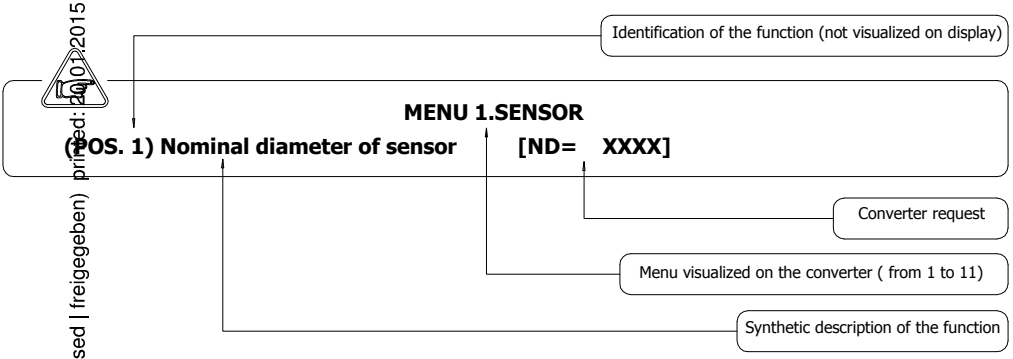


MN1000099449 EN Version: - Status: RL (released) Printed: 20.01.2006

FUNCTIONS DESCRIPTION

(description of the functions with access code< 3)

MANUALE 09439 Edizione: RL (released | freigegeben) printed: 20/01/2015


Identification of the function (not visualized on display)
MENU 1.SENSOR
(POS. 1) Nominal diameter of sensor [ND= XXXX]
Converter request
Menu visualized on the converter (from 1 to 11)
Synthetic description of the function

N.B.: follow are detailed description only some functions of the converter (see note to page 20)

MENU 1.SENSOR

(POS. 1.8) "Autozero" calibration [AUTOZERO CAL.]

Enables the automatic zero calibration system. To perform the sensor it is absolutely necessary the sensor is full of liquid and that the liquid is perfectly staying still. Even very small movement of the liquid may affect the result of this function. When the percentage flow rate value is stable press the key ⇩ . Check the percentage flow rate value goes to zero, otherwise repeat the operation again. When the value is stable at zero, then press ⇳ .

(POS. 1.7) "Empty pipe" calibration [E.P. CALIBR.]

This function enables the automatic calibration procedure of the empty pipe detection function. Before performing this function, the sensor has to be completely filled with the liquid. The sensor has then to be emptied again and then you should press the key ⇳ : the operation will have to be confirmed by pressing the key ⇦ or any other key annul the operation. By this function the system sets the value of a parameter, which could also be manually changed (see function "E.P.thr" menu 4-ALARMS).

MENU 2.SCALES

(POS. 2.1-2.2) Full scale n° 1-2 [FS1-2=dm³/S X.XXXX]

Full scale value set for range N.1-2. There are four fields to fill in order to set this parameter, from left to right: 1) volume unit of measure, 2) type of unit, 3) time unit of measure and 4) numeric value. The selection is made by positioning the cursor on the field to modify. To change the type of unit of measure (metric, British or American, mass or volume) the cursor has to be positioned on the symbol "/" (field N. 2). When the nominal diameter is set to zero it is possible to modify only the numeric field, since the unit of measure stays at m/sec. The following tables show the units of measure available and the conversion factor by comparison with 1 dm^3 and 1 kg. The converter accepts any kind of combination of units of measure satisfying both the following conditions:

Numeric field value ≤ 99999

$^1/_{25}$ fs_{max} ≤ numeric field value ≤ fs_{max}.

Where fs_{max} is the maximum full scale value corresponding to the sensor, equal to a 10 m/sec liquid speed. The units of measure are shown as appear on the display. The British and American units are diversified by using capital and small characters. Available units of mass and volume:

cm^3	Cubic centimetre
ml	Millilitre
l	Liter
dm^3	Cubic decimeter
dal	Decalitre
hl	Hectolitre
m^3	Cubic metre

in^3	Cubic inch
Gal	American gallon
GAL	British gallon
ft^3	Cubic foot
Bbl	Standard barrel
BBL	Oil barrel
yd^3	Cubic yard
kgl	KAmerican gallon
KGL	KBritish gallon

G	Gram
Kg	Kilogram
T	Ton

Oz	Ounce
Lb	Pound
Ton	short tons

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When a mass unit of measure is set, the specific gravity function is automatically enabled by the system. The units of measure of time may be chosen among the values: **s**=second,**m**=minute,**h**=hour,**d**= day.

(POS. 2.3) Unit of measure and number of decimal totalizes [UM.tot:dm³X.XXX]

Setting the unit of measure and number of decimals for visualized the totalizes or the volumes to batch. For set the unit of measure, position the cursor on field of the actual unit of measure; For set the type of unit, position the cursor on the blank space between the unit of measure and the numeric value; For set the number of decimal totalizes position the cursor on numeric field and choose one of the possible combinations: 1000-01.00-001.0-00001.

***(POS.2.4-2.5) Pulse value channel 1 and unit of measure of tot. [IMP1-2=dm³X.XXXXX]**

Setting of the pulse volume corresponding to channel 1-2 and of the totalizers measure units. There are three fields to fill in to set this parameter, from left to right: 1) measure unit, 2) unit type and 3) numeric value. The selection is performed by positioning the cursor on the field to be modified. To change the unit type (metric, British or American, mass or volume) just position the cursor on the blank space between the measure unit and the numeric value. When the nominal diameter is set to zero it is possible to modify only the numeric field since the measure unit stays at meter (m) or feet (ft). The possible measure units are those above described

(POS.2.6-2-7) Pulse duration channel 1-2 [TPUL1-2=msXXXX.XX]

Setting of the duration of the pulse generated on channel 1-2. Its value is expressed in milliseconds and has to be between 0.4 and 9999.99. When the high frequency output is present, then the minimum value can go down to 0.04 milliseconds.

ATTENTION: since the instrument cannot detect which type of device it is connected to, it is up to the user to verify the set pulse duration is compatible with the external device processing such pulses. If, for example, an electro-mechanical pulse counter is connected, then two kind of problems may occur: if the pulse is too long than the coil may burn or, if it is too short, the counter may not be able to count and eventually even cause the damaging of the output itself.

MENU 3.MEASURE

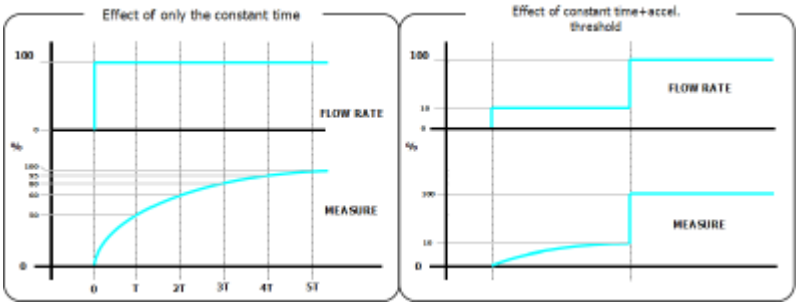
(POS. 3.1) Time constant [TCONST=s XXXX.X]

This parameter affects the integrating filter making the instrument response quicker or slower, according to the set value. A higher value corresponds to a more stable but slower measure, a smaller value the opposite. The most common values are from 1 to 5 seconds. The valid range of value it's from 0 (integral filter disabled) to 6000.0 seconds. The following diagram shows the response of the instrument for a flow rate variation from 0 to 100% within the T time constant period

(POS. 3.3) Acceleration threshold

Acceleration threshold set. The acceleration threshold stands for the limit beyond which a flow rate variation determines an immediate response at the output, without being filtered by the time constant. This system allows the instrument to have an immediate response in case of big variations of the flow rate, filtering (and delaying) the response to small variations. The result of that is a very stable measure, ready to follow the process. The value is set as percentage of the full scale value from 0 to 125%. If such a value is set to zero any flow rate variation bigger than 0.5% of the full scale value will immediately affect the outputs. The following diagram shows the instrument response in two cases: a flow rate variation from 0 to 10% completely absorbed by the time constant effect and a variation form 10% to 100% exceeding the acceleration threshold and then immediately sent

to the output. In actual fact there is always a minimum time between the measure acquisition and the outputs update.



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(POS. 3.4) Peak cut off threshold **[PEAK THR=% XXX]**

Anomalous signal pick cut off threshold set. This parameter allows setting the maximum value of deviation of the actual measure sample by comparison with the average one. If the new value is higher than the set limit, than such a value is "cut" to the limit value. This function is used to make the meter less sensitive to big perturbations on the flow rate measure, as it may happen when there are solids in suspension in the liquid hitting against the electrodes determining a high electrical noise. The permitted values of this function **range** from 0 to 125 % and are referred to the full scale value. If this parameter is set to zero the peak detection function is disabled and any new measure ample will be accepted and processed as it is by the converter.

(POS. 3.7) Automatic scale change enable **[AUTORANGE=ON/OFF]**

Enables the automatic change of scale. The meter may have two different working ranges in order to suit to the variable process conditions. In order to get the best results out of this function it is important range N.2 is bigger than N.1. When the flow rate increases and reaches the 100% of the full scale 1, then the meter automatically switches to scale 2. When the flow rate decreases again reaching a value on scale 2 equal to the 90% of full scale N.1, then the active scale is 1 again. Allowed values for this parameter: ON / OFF. **N.B.:** the autorange doesn't allow using the manual change of range (see pos. 5.8)

(POS. 3.8) Energy saving enable **[E.SAVING=ON/OFF]**

This function is used when the instrument is powered by a battery or solar cells, allowing an energy saving up the 60-80. The energy consumption is controlled by the ratio between the measuring cycles powering the coils and the cycles without powering the coils. When the flow rate is stable the number of "off" cycles is higher than the "on" ones, so that the average consumption is strongly reduced. If the flow rate suddenly changes, then the meter switches on a higher number of measuring cycles, in order to get a higher response time, switching off the cycles as soon as the flow rate gets back to be stable. If the flow rate varies below of the "acceleration threshold" (POS.18) percentage value, then the meter goes on with "off" cycles, but as soon as the flow rate value exceeds such a threshold, the meter switches on many measuring cycles again. Allowed values for this parameter: ON/OFF **N.B.:** to optimise this function it is recommended choose a value for the acceleration threshold within 10÷15 (POS. 3.3)

MENU 4.ALARMS

(POS. 4.7) Current output value in case of failure **[mA VAL.FAULT =% XXX]**

Setting of the value the 0/4...20 mA current output has to be in one of the following cases:
empty pipe; coils interrupted; ADC error
The allowed range is from 0 to 120% of the 0..20 mA scale, 120% corresponds to 24 mA and does not depend on the selected range (0…20 / 4…20 mA). The NAMUR NE43 recommendation asks for a alarms signalling value for the current output lower than 3.6 mA (<18%) or bigger than 21 mA (>105%). It would then be preferable to set the value of this function at the 10%, so that the current value in case of the a.m. cases would be 2 mA, allowing the following diagnostics:

current < 2 mA - 5%: line interrupted, power supply failure or faulty converter;
2 mA -5% ≤ current ≤ 2 mA + 5%: hardware alarm;

4 mA ≤ current ≤ 20 mA: normal working range;
20 mA < current ≤ 22 mA: out of range, measure above 100% f.s.

N.B.: To set this parameter to zero corresponds to disable the alarm

(POS. 4.8) Frequency output value in case of failure [Hz VAL.FAULT=%XXX]

Setting of the frequency value to assign to the on/off output in one or more of the following cases:
Empty pipe ; Coils interrupted ; ADC error
The allowed range is from 0 to 125% of the frequency full scale value. Although there are not specific rules regulating cases like this one, it would be convenient to use the failure information as follows:

- 0% Hz ≤ frequency ≤ 100% f.s.: normal working range;
- 100% f.s. < frequency ≤ 110% f.s.: overflow, measure above the 100% of the f.s.;
- 115% f.s. ≤ frequency ≤ 125% f.s.: hardware alarm condition.

(POS. 4.9) Batch safety timer

This function is useful when you need control one or both of the followings condition:

- Batch valve open and flow rate is zero
- Batch valve closed and flow rate different to zero

When this alarm is activates, they are aborted the batch operation and the power supply of the valve. The values of function are from 0 to 25.5 seconds and is active only if one or more of the batch functions are enable.

MENU 5.INPUTS

(POS. 5.1-5.2-5.3-5.4) Totalise + reset enable [T/P+/-RESET=ON/OFF]

To make the reset of the totalise from the key board it is necessary enable the function 8.7 (modify tot.) and one of function from 5.1 to 5.4.
From visualisation pages, proceed in the following mode:

1) Push the key , Set the L2 CODE if required and then push the key
2) Positioning the cursor on value field to modify the numerical value (it's possible only modify the totalizer enabled) push the key to confirm the modified value
3) Positioning the cursor on "RESET TOTALIZ.?" Push the key and then the key to confirm or any other key to cancel this operation.

With function 8.7 disabled it's possible reset the totalizer pushing the key from visualization page, at the required "RESET TOTALIZ.?" Push the key and then the key to confirm or any other key to cancel this operation

(POS.5.7)"Autozero" calibration external command enable [CALIBRATION=ON/OFF]

When this function is active, applying a voltage on the on/off input terminals the meter performs a autozero calibration cycle. ATTENTION: if the voltage pulse is less 1 sec., the meter performs a calibration cycle for compensate possible thermal drifts. If the voltage pulse is more 1 sec, the meter performs a zero calibration of measure. This function enables/disables the automatic zero calibration system. To perform the sensor it is absolutely necessary the sensor is full of liquid and that the liquid is perfectly staying still. Even very small movement of the liquid may affect the result of this function, and, consequently, the accuracy of the system.

(POS. 5.8) Range change external command enable [RANGE CHANGE=ON/OFF]

Range change external command enables. When this function is enabled, applying a voltage on the on/off input terminals the meter switches to the second measuring range (Fs2).

N.B.: the autorange doesn't allow using the manual change range (see pos. 3.7)

(POS.5.10)Functions assigned to input 2 [ING.2=XXXXXX]

Choice of the function to associate the input 2 The functions are listed in the table below.

FUNCTION FOR INPUT 2

OFF: DISABLE
T+ RESET: RESET TOTAL DIRECT TOTALIZER FOR DIRECT FLOW RATE (+)
P+ RESET: RESET PARTIAL DIRECT TOTALIZER FOR DIRECT FLOW RATE (+)
T- RESET: RESET TOTAL REVERSE TOTALIZER FOR REVERSE FLOW RATE (-)
P- RESET: RESET PARTIAL REVERSE TOTALIZER FOR REVERSE FLOW RATE (-)
BATCH: START/STOP BATCH
MD SELECTION: STATIC SELECTION OF FORMULA

Siemens mod. FUT 2000 Ultrasonic flowmeter (released from software version 2.00 and higher)

MENU 6.OUTPUT

(POS. 6.1-6.2-6.3-6.4) Function corresponding to on/off output 1-2-3-4 [OUT1=XXXXXX]

Choice of the function corresponding to digital Output 1. The functions are listed in the table to the next page

The output 3-4 are optional and the output 4 it' the only output, which can reach a 12.5 KHz frequency.

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FUNCTION FOR OUTPUT 1, 2,3,4

OFF: DISABLED
#1 IMP+: PULSE ON CHANNEL 1 FOR POSITIVE FLOW RATE
#1 IMP-: PULSE ON CHANNEL 1 FOR NEGATIVE FLOW RATE
#1 IMP±: PULSE ON CHANNEL 1 FOR POSITIVE AND NEGATIVE FLOW RATE
#2 IMP+: PULSE ON CHANNEL 2 FOR POSITIVE FLOW RATE
#2 IMP-: PULSE ON CHANNEL 2 FOR NEGATIVE FLOW RATE
#2 IMP±: PULSE ON CHANNEL 2 FOR POSITIVE AND NEGATIVE FLOW RATE
#1 FREQ+: FREQUENCY CHANNEL 1 FOR POSITIVE FLOW RATE
#1 FREQ-: FREQUENCY CHANNEL 1 FOR NEGATIVE FLOW RATE
#1 FREQ±: FREQUENCY CHANNEL 1 FOR POSITIVE AND NEGATIVE FLOW RATE
#2 FREQ+: FREQUENCY CHANNEL 2 FOR POSITIVE FLOW RATE
#2 FREQ-: FREQUENCY CHANNEL 2 FOR NEGATIVE FLOW RATE
#2 FREQ±: FREQUENCY CHANNEL 2 FOR POSITIVE AND NEGATIVE FLOW RATE
SIGN: FLOW DIRECTION OUTPUT (ENERGISED = -)
RANGE: RANGE INDICATION OUTPUT (ENERGISED = SCALE 2)
MAX AL+: MAX DIRECT FLOW RATE OUTPUT(ENERGISED = AL. OFF)
MAX AL-: MAX REVERSE FLOW RATE OUTPUT(ENERGISED = AL. OFF)
MAX AL±: MAX DIRECT/REVERSE FLOW RATE OUTPUT(ENERGISED = AL. OFF)
MIN AL+: MIN DIRECT FLOW RATE OUTPUT(ENERGISED = AL. OFF)
MIN AL-: MIN REVERSE FLOW RATE OUTPUT(ENERGISED = AL. OFF)
MIN AL±: MIN DIRECT/REVERSE FLOW RATE OUTPUT(ENERGISED = AL. OFF)
MAX+MIN±: MAX AND MIN FLOW RATE ALARM OUTPUT (ENERGISED = AL. OFF)
EMPTY PIPE: EMPTY PIPE ALARM OUTPUT (ENERGISED = FULL PIPE)
OVERFLOW.: OUT OF RANGE ALARM OUTPUT (ENERGISED = FLOW RATE OK)
HW ALARM: CUMULATIVE ALARM OUTPUT interrupt coils, empty pipe, measure error (ENERGISED = NO ALARMS
BATCH AL: BATCH ALARM
EXT. COMM.: ONLY AVAILABLE WITH DATA LOGGER MODULE
BATCH SIN.: AT THE AND OF BATCH THE OUTPUT CHANGE STATUS
END BATCH.: END BATCH OUTPUT (ENERGISED =BATCH IN PROGRESS)
PREBATCH.: PREBATCH OUTPUT (ENERGISED = PREBATCH IN PROGRESS)

(POS. 6.5)duty cycle value for pulses/frequency output [OUT.1=XXXXXX]

The duty cycle function define the time ratio between ON and OFF state when frequency output are used: 50% it mean that the ON phase will be the same of OFF phase, 60% it mean that the phase ON will be 60 % and phase OFF will be 40% of the total cycle time.

When pulses outputs are used , the duty cycle define the OFF phase because the ON phase it's already set with the function "PULSE DURATION"(see menu "SCALE") . In this case if is setting for example the duty cycle at 50% and the pulse duration to 50ms, the OFF phase will be the same of ON phase. The formula for calculate the minimum time of the OFF phase and the time of total cycle is the following:

T. total cycle= 100 x (pulse duration in ms)/ (duty cycle)

T. OFF phase = T. total cycle - pulse duration

N.B.: If the value of the function is set to 0 the issue of the pulses happens in synchronous mode with the flow rate therefore when is uses the function in frequency DOESN'T set the duty cycle to 0.

(POS. 6.6-6.7) Function and the range of current output n.1-2 [OUT.mA1-2=X÷XX±]

Choice of the function and the range of current output N.1-2. The current output N.1 is **optional and it is** mounted on the main board. There are three fields to modify for this function:

- Scale zero: **4** or **0** mA ; Full scale: **20** or **22** mA
- Field: **+** = positive, **-** = negative, ± = both, -0+ = central zero scale

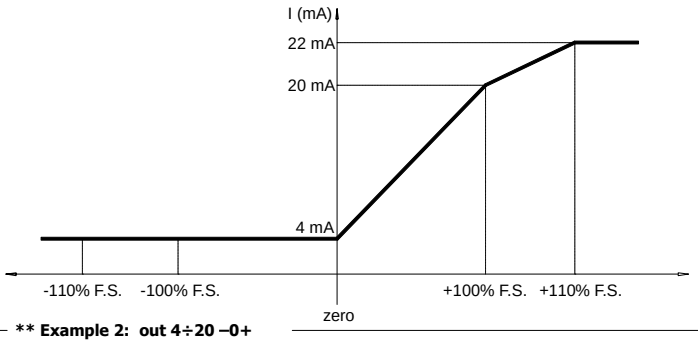
The values corresponding to the scale points are shown in the following chart:

CURRENT VALUES IN mA ASSOCIATE TO THE % VALUE OF FULL SCALE

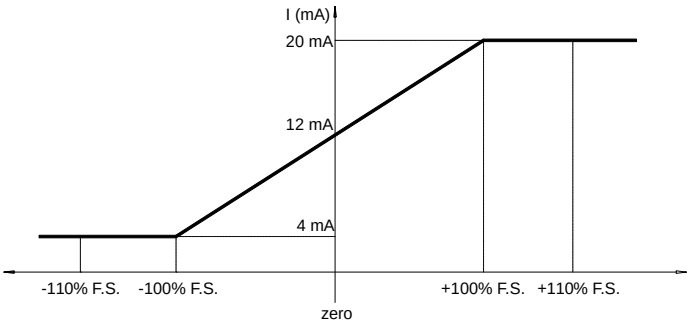
POSSIBLE FIELD	REVERSE FLOW VALUE		ZERO	DIRECT FLOW VALUE	
	≤ -110%	-100%	0%	+100%	≥+110%
OutmA = 0 ÷ 20 +	0	0	0	20	20
OutmA = 0 ÷ 22 +	0	0	0	20	22
OutmA = 4 ÷ 20 +	4	4	4	20	20
* OutmA = 4 ÷ 22 +	4	4	4	20	22
OutmA = 0 ÷ 20 -	20	20	0	0	0
OutmA = 0 ÷ 22 -	22	20	0	0	0
OutmA = 4 ÷ 20 -	20	20	4	4	4
OutmA = 4 ÷ 22 -	22	20	4	4	4
OutmA = 0 ÷ 20 ±	20	20	0	20	20
OutmA = 0 ÷ 22 ±	22	20	0	20	22
OutmA = 4 ÷ 20 ±	20	20	4	20	20
OutmA = 4 ÷ 22 ±	22	20	4	20	22
OutmA = 0 ÷ 20 –0+	0	0	10	20	20
OutmA = 0 ÷ 22 –0+	0	1	11	21	22
** OutmA = 4 ÷ 20 –0+	4	4	12	20	20
OutmA = 4 ÷ 22 –0+	4	4.8	12.8	20.8	22

In hardware alarm conditions "HW ALARM" (interrupted coils, empty pipe, measure error) the current value is programmed by the function "mA VALL. FAULT" (pos. 4.7) and it is expressed as percentage of a fixed current range, where: 0% = 0 mA e 110% = 22 mA.

*** Example 1: out 4÷22 +**



**** Example 2: out 4÷20 –0+**



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ANALOG Version: Status FR (released | freigegeben) printed: 02.04.2009

MENU 8.DISPLAY

(POS. 8.3) Display contrast set [CONTRAST=X]

Display visual contrast set. The contrast can change according to the room temperature. The set values are from 0 to 15. The entered value has effect only when leaving the function itself.

Contrast also can be set from visualization pages (pag. 17) pushing the key ⇦ for 8 second or more. In this way the contrast set that will be visualized at release of the key.

(POS. 8.12-8.13) Conversion factor for flow rate totaliser [EUR/dm³+ =X]

Set the value of conversion/currency for direct totalise(positive). There are three set fields for this parameter, from left to right: 1) monetary token, 2) default/personalized monetary token, 3) conversion coefficient. For the selection setting the cursor over the field to modify. The mode set of monetary token could be two:

1. Choice of one of the 7 predetermined monetary tokens (standard ISO 4217-REV81): EUR = Eur ; USD = USA ; dollar CAD = Canadian dollar ; AUD = Australian dollar ; GPB = English pound ; CHF = Swissfranc ; JPY = Japanese yen.
2. Choice three free characters (number or letter) . To change the characters , the cursor has to be positioned on the symbol "/" (field N. 2)

MENU 9.DATA LOGGER

(POS. 9.1) Date and time set [🕐 = dd/mm/yy hh:mm]

Date and time set. If the real time clock optional module is present, then the time setting is kept also when the power supply is off, otherwise it is frozen till the power supply is back. For example, if the power supply has been off for one hour, when switched on the instrument will be one hour late. The calendar is valid till year 2091. **N.B.:** date and time are visualized on display only if the data logger is enable (Pos 9.2).

MENU 10. DIAGNOSTIC

(POS. 10.1) Meter "calibration" [CALIBRATION]

Enable the calibration of the meter. The activation of this function happens pressing the key ⇨ during the visualization of the function. Will be visualized the following question: " EXECUTE?" press for more of two second the key ⇦ to proceed . Press any other key to delete the operation

(POS. 10.2) "Autotest" function enable [SELF TEST]

Meter autotest function. This function stops the normal functions of the meter and performs a complete test cycle on the measure input circuits and on the excitation generator. To activate this function, after select it, push key ⇨ , at the question: "EXECUTE?" push the key ⇦

For start autotest, or any other key for delete operation. The result of the test is shown on the display. At the end of operation will have visualized one of visualization page. This function is automatically performed when switching on the device.

(POS. 10.3) Flow rate simulation [SIMULATION]

Flow rate simulation enabling. With this function it is possible to generate an internal signal that simulates the flow rate, allowing the outputs and all the connected instruments test. After enabling it, the flow rate simulation can be:

- set: by pushing the key ⇦ from one of four visualization pages
- started: by pushing the key ⇨ after set it
- finished: by pushing the key ⇦ from visualization pages and then by pushing the key ⇦ .

N.B.: the enable of flow rate simulation disable the contrast regulation with the key ⇦ (Pos. 8.3)

MENU 12.BATCH

Menu visualized only with batch active (output on batch and/or pos. 5.9 enable or 5.10 on batch)

(POS. 12.1) Number of batch samples [N.SAMPLES=XXX]

Number of batch cycles to be done to define the value of compensation. This function allows to automatically determine the average value for automatic compensation of system delay (POS. 9.3) . Set to ZERO this function for manually introduction of the compensation value.

(POS. 12.2) % limit of compensation [DIFF.THR=%XXX]

This value defines the percentage of maximum difference between the compensation value set (see pos. 12.3) and the average compensation value defined with the function 12.1. Over this threshold the new compensation value will be automatically set (if Number of batch samples is different from zero).

(POS. 12.3) Compensation value [V.COM.=XX.XXX]

This value, expressed in the same selected volume unit of measure, is the result of the difference between the batch value set and the quantity of product really supplied due to the system delays: closing valves, stop pumps, stop motors, etc. Attention: if you need to set manually the value of compensation, preset to ZERO the Number of batch samples (POS. 12.1)

(POS. 12.4) Prebatch value [V.PRE.=XX.XXX]

set the volume of liquid at which you want to enable the pre-batch. When the pre-batch volume "V Pre" is reached the output (if enabled) is de-activated. This value is constant for all quantities to be batched and must be set in current volume unit of measure. The pre-batch function is useful when you need fast and accurate fillings.

(POS. 12.5) Enable/disable auto-batch function [AUTO BATCH=ON/OFF]

Applying a voltage on the on/off input terminals for more than 5 second the valve controlled by the meter stands open while the voltage is applied on the input. When the product has reached the desired volume/level, removing the voltage from the input, the meter closes the valve and memorizes the supplied product volume in the current memory batch (see "BATCH FUNTIONS"); the value obtained with this procedure will be the volume supplied in every following batch. In order to modify this value, repeat the operations above. This procedure set the safety timer at a value 1.25 times greater than the time used to reach the batched quantity; after that the counter will be reset.

(POS. 12.6) Automatic selection of batch formula [BM AUTO SEL=ON/OFF]

The function allows the automatic selection of the first 4 formulas depending on the duration of the pulse of the batch start (see page 11 "Input operation stage"). This function is active only if the function cons. mode (POS. 12.7) has not enabled. Besides, activating this function, the automatic compensation of the batch volume is also excluded (the value of the parameter "N.medie" (POS. 12.1) will be automatically set to zero). However the manual compensation is possible introducing the opportune value on the parameter "V.com" (POS. 12.3)

(POS. 12.7) Static consent of batch [Cons. mode=ON/OFF]

The function enable the start and the stop of the dosing using a static signal, instead of an impulsive, applied to the input (see pag. 11 "Digital input), this signal will have to stand applied all through the batch. This function automatically disables the functions "BM AUTO SEL" (POS. 12.6) and " AUTO BATCH" (POS. 12.5).

Questo manuale è di proprietà della ditta costruttrice. Vietata la riproduzione anche parziale senza autorizzazione scritta.

BATCH FUNCTION.

ENABLE BATCH

Enable one of the following functions to enable and program the batch on the converter:

- ❑ POS. 5.9-5.10: START/STOP batch from input
- ❑ POS. 6.1-6.2: assign one of the functions to one of two output

Some examples of operation of such functions are visualized from page 11

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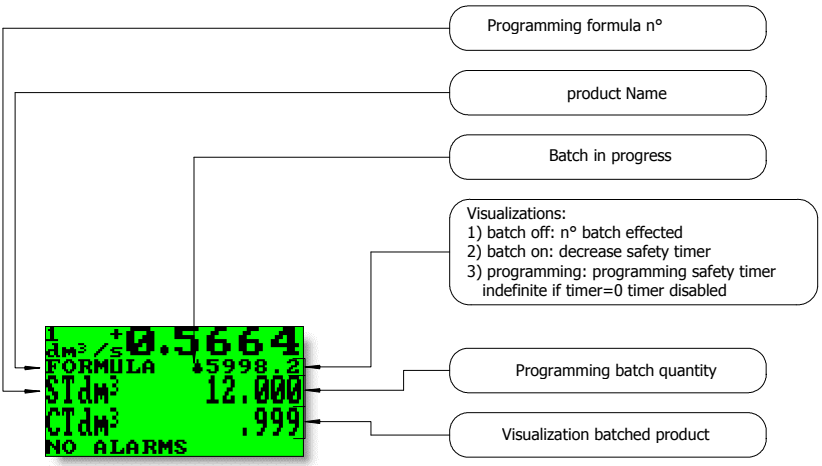
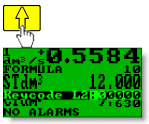
VISUALIZATION PAGE WITH BATCH FUNCTION ENABLE



From the visualization pages



Input key code

Choose the formula number for associate quantity batch (between 00 and 15)

Input quantity product for each batch

Input product name for batch (max 8 characters.)

Input maximum time for batch
If timer = 0, safety timer disabled max time set = 6000 sec.
N.B. if to one output is assigned the function of batch alarm, to the attainment of the maximum time, beyond to the interruption of the batch, will have activated also the alarm output

PROGRAMMING BATCH

For each formula you can associate:

- ❑ Product quantity
- ❑ Product name
- ❑ Maximum time for batch (safety time for each formula)

After activating the batch function from visualization page at pages 47, proceed as in the aside example.

START STOP BATCH

START: it is possible activate the start of batch in two different way:

1. **from remote input:** assigning the functions of start/stop batch to the input 1 (POS. 5.9) or input 2 (POS. 5.10) and using the input/s like visualized from page 12.
2. **from keyboard:** short pressing of the key ⇧
   N.B.: the start of batch from keyboard is always on the descent front (release of the key) and is not available with the function of batch consent (POS. 12.7)

STOP: the stop of batch can be due to three events:

1. **keyboard or remote input** (manual stop): short pressing of the key
2. **end of batch:** in this case the stop of batch will have activated from a output signal to the attainment of the batch quantity
3. **maximum time of batch:** if a maximum batch time has been set and this is exceeded, the batch in progress is stopped independently from the batched quantity

Notes:

- during the batch the symbol of the active batch ⏻ and the name of the formula are visualized on video.
- When the batch outputs are enable, pushing for more of 5 sec. the key ⇧ , the outputs will remain energized till the key is released. On the display, in place of the CT and ST totalisers the following messages will appear:
  !! VALVE !!
  !! OPENED !!

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IMPORTANT NOTES

The start of the batch disables any function listed below:

		POS 12.5	POS 12.6	POS 5.6	POS 12.1	POS 5.9	POS 3.7-5.8	POS 3.8	POS 5.7
		AUTO BATCH	BM AUTO SEL	BLOCK TOTALIZER	N. SAMPLES	INPUT 1 ON START/STOP BATCH	AUTO RANGE CHANGE OR FROM 1 INPUT	ENERGY SAVING	CALIBRATION
POS 12.5	AUTO BATCH			*DISABLE					
POS 12.6	BM AUTO SEL				** DISABLE				
POS 12.7	CONS. MODE	DISABLE	DISABLE	* DISABLE					
POS 5.9	INPUT 1 ON START/STOP BATCH						DISABLE	DISABLE	DISABLE
POS 5.10	INPUT 2 ON START/STOP BATCH					DISABLE	DISABLE	DISABLE	DISABLE
POS 5.10	BM SELECT		DISABLE		** DISABLE				
POS 6.1÷6.4	OUTPUT ON END BATCH							DISABLE	

AGISCE SU

* SE UTILIZZATO INGRESSO 1 A VALORE A ZERO

To optimize the performances of the meter used as a batch instrument, it is recommended to set it as prompt as possible according to the plant requirements, choosing the opportune values of time constant (pos. 3.1) and acceleration threshold (pos. 3.2).

Alarm messages, causes and actions to be taken

Messages	ANOMALIES	ACTION TO TAKE
NO ALARMS	All works regularly	-----
MAX ALARM	The flow rate is higher than the maximum threshold set	Check the maximum flow rate threshold set and the process conditions
MIN ALARM	The flow rate is lower than the minimum threshold set	Check the minimum flow rate threshold set and the process conditions
FLOW RATE >FS	The flow rate is higher than the full scale value set on the instrument	Check the full scale value set on the instrument and the process conditions
PULSE/FREQ>FS	The pulse generation output of the device is saturated and cannot generate the sufficient number of impulses	Set a bigger unit of volume or, if the connected counting device allows it, reduce the pulse duration value
EMPTY PIPE	The measuring pipe is empty or the detection system has not been properly calibrated	Check whether the pipe is empty or perform again the empty pipe calibration procedure
BATCH ALARM	Batch interrupted for the followings condition: ❑ Timer batch expired before the end of the batch ❑ Batch valve open and flow rate to zero for a time longer to the safety timer set ❑ Batch valve closed and flow rate different from zero for a time longer to the safety timer set	Verify: ❑ Presetting ❑ System condition
INPUT NOISY	The measure is strongly effected by external noise or the cable connected the converter to the sensor is broken	Check the status of the cables connecting the sensor, the grounding connections of the devices or the possible presence of noise sources
EXCITATION FAIL	The coils or the cable connecting the sensor are interrupted	Check the connecting cables to the sensor
CURR.LOOP OPEN	The 0/4...20mA output on board or the optional one are not correctly closed on a valid load	Verify the load is applied to the output (max 1000 ohm). To disable the alarm,set the "mA VAL.FAULT" value (menu alarm) to 0.
P.SUPPLY FAIL	Power supply different from that indicated on the label.	Verify that the power supply is that indicated on the label

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Anomalies codes

CODES	ANOMALIE DESCRIPTIONS	ACTION TO TAKE
0001	**problem with watch-dog circuit**	ADDRESSING TO SERVICE
0002	wrong configuration work data in eeprom	
0004	wrong configuration safety data in eeprom	
0008	defective eeprom	
0010	defective keyboard (one or more key are pushed during the test)	
0020	Power supply voltage (+3.3) is out of range	
0040	Power supply voltage (+13) is too low (<10V)	
0080	Power supply voltage (+13) it's too high (>14V)	
0200	timeout calibration input (input circuit is broken)	
0400	Gain input stage is out of range	Check the status of the cables connecting the sensor to the converter, the grounding connections of the devices or the possible presence of strong and anomalous noise sources
0800	Interruption on the coils circuit	Check the status of the cables connecting the sensor to the converter
0C00	Cumulative alarm 0800 + 0400	see single code

APPENDIX 1

Display rotation

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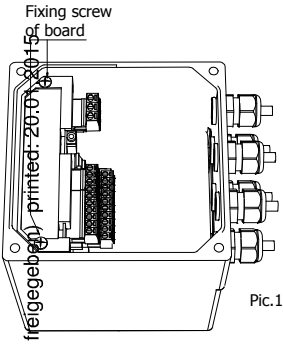
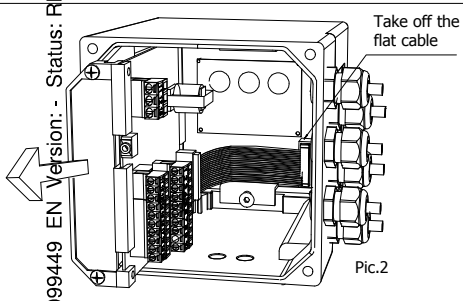


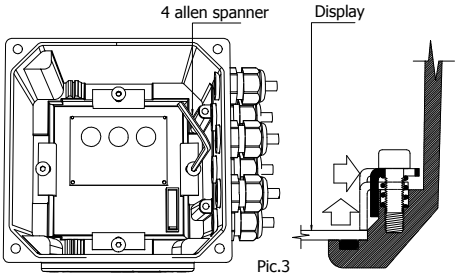
Pic.1

- ❑ Unscrew the screws suitable in pic. 1



Pic.2

Lift the board, take off the flat cable from the display pic. 2 and extract definitely the board from the box

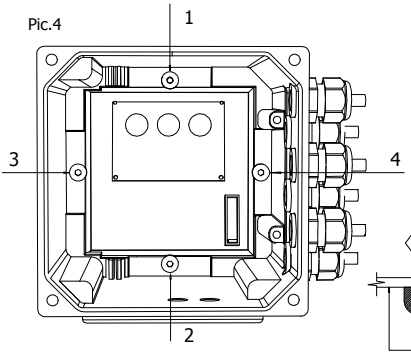


Pic.3

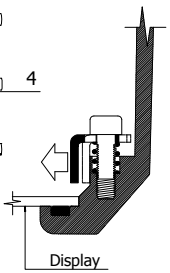
Unscrew the fixing screw of display to allow the shift of the angular and the extraction of the display

N.B.: don't unscrew entirely the screw

Pic.4

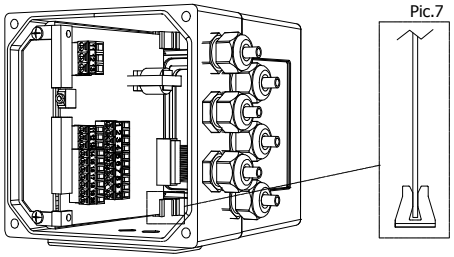


Pic.5



- ❑ Rotate the display in the desired location, verify the correct set of the seal, the cleaning of the contact surfaces of and set the display in the lodging.
- ❑ Shift the angular in the suitable direction (pic. 5) and screw down the scew, till to the support perception of the angular on the display
- ❑ Shut definitely the screw in the order 1-2-3-4 suitable in represents pic. 4

Pic.6



Pic.7

Restore the connection of the flat cable to the display

Verify the correct set of the board in the fixing clip (Pic.7)

Finish the assemblage fixing to the box the board

DECLARATION OF CONFORMITY
According to ISO / IEC Guide 22 and EN 45014

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Product's name: **Electromagnetic flow meter series'**

Converter model: **SE 56**

Option: **all applicable**

Sensors model: **SO 501 – SO 600 – SO 1000 – SO 2410 – SO 2500 – SO 3700 – SO 3770 – SO 5000**

BURKERT declares that the above mentioned products satisfy the following requirements:

Safety

EN61010, dielectric strength = 4 kV, installation category II, IP65

EMC

EMC reference : **Immunity: EN 61326-1**
Emission: EN 61326-1

Test :

- **EN55011** (150 kHz – 30 MHz): Group 1, class **B**
- **EN55011** (30 MHz – 1GHz): Group 1, class **B**
- **IEC 1000-4-2**: **4 kV** CD, **8 kV** AD
- **IEC 1000-4-3** (f = 80 MHz – 1 GHz, antenna at 3 m, AM modulation 1kHz 80%): **10 V/m**
- **IEC 1000-4-4**: **4 kV** on all ports
- **IEC 1000-4-5** (2kV diff/2kV common mode)
- **IEC 1000-4-6** (f = 150 kHz – 80 MHz, AM modulation 1 kHz 80%): **10 V**
- **IEC 1000-4-11**

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FILE NAME:
210_EN_BU_4_3_5X.doc

The last three character of file name , identify the sw version which the manual is refer . the sw version is visualized during switch on of converter